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10/524,855	07/19/2005	Ole-Jacob Siljan	2005_0237A	3561

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EXAMINER	
MENDEZ, ZULMARIAM	
ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/524,855	SILJAN ET AL.	
	Examiner	Art Unit	
	ZULMARIAM MENDEZ	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *39-64,78 and 79* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *39-64,78 and 79* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 39-42, 44-55, 57-60, 62-64, 78 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jarrett et al. (US Patent no. 4,737,247) in view of Nguyen et al. (US Patent no. 2005/0000823).

With regard to claims 39-42, 44-47, 55, Jarrett discloses a method for electrolytic production of aluminum metal from an electrolyte comprising alumina (aluminum oxide), by performing electrolysis in an electrolysis cell (col. 2, lines 28-33) containing at least one electrolysis chamber with at least one bipolar electrode containing both anode and cathode (col. 1, lines 47-52 and 58-65), where the anode evolves oxygen gas and the cathode has aluminum discharged onto it in the electrolysis process (col. 2, lines 39-63), said oxygen gas enforcing an electrolyte flow pattern upward (col. 3, lines 27-29;

see figure) and said produced aluminum flowing downward due to gravity (col. 2, lines 58-63), wherein the temperature of the active surface of the electrodes is inherently, or in the alternative, obviously controlled and maintained at a level different from that of the surrounding electrolyte using active or passive cooling and/or active and passive heating, such as by having heat pipes to allow a heat exchange in the system, with at least one flow channel connected to the anode stem (col. 2, line 63 to col. 3, line 31, see figure), the cooling medium in the heat pipes may be gas or liquid sodium or potassium (col. 3, lines 3-18) and wherein the anode is attached to the electrical conductor system through an electric connection (see claim 3). However, Jarrett fails to explicitly teach wherein the temperature of the active surface of the anode is colder than the temperature of the active surface of the cathode.

Nguyen teaches a method for electrolytic production of aluminum from an electrolyte comprising alumina (abstract; page 1, paragraph 1) wherein the active surface layer of the anode slowly dissolves into the electrolyte during operation (abstract). Thus, the temperature at the anode side is kept sufficiently low in order to limit contamination of the product aluminum to an acceptable level. Since Jarret discloses controlling and maintaining the temperature of the active surface area of each electrode at a predetermined level using active or passive cooling and/or active and passive heating, such as by having heat pipes to allow a heat exchange in the system, with at least one flow channel connected to the anode stem (col. 2, line 63 to col. 3, line 31, see figure), one having ordinary skill in the art would have found it obvious to maintain the temperature at the active surface area of the anode sufficiently low, as

taught by Nguyen, i.e. colder than the active surface area of the cathode, in order to limit contamination of the product aluminum to an acceptable level due to dissolution of the active surface layer of the anode during operation.

With regard to claims 48 and 57, Jarrett teaches all of the method steps, as discussed above, wherein said cooling of electrical connection is obtained by using an highly electrical conductive metal but fails to teach wherein it has a large cross sectional area of at least 1.1 - 5.0 times the cross sectional area of the anode stem cross sectional area. It has been held that where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. *In re Rose* , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984). Also see MPEP 2144.

With regard to claim 49, Jarrett further teaches wherein the anode has an anode stem (top portion of the anode which is parallel to the heating pipe (9)) between the submerged anode (2) and the electrical connection (the figure shows wherein the anode is electrically connected to the positive terminal of a power supply), said stem having a cross sectional ratio to the anode cross section area of at least 0.005 - 0.5. As shown in the figure, the cross sectional area of the anode stem is smaller than half the cross sectional area of the anode (2).

With regard to claims 50-51, 53, 54, 59 and 64, Jarrett discloses all of the method steps, as discussed above, wherein the cathode stem has a cross sectional ratio to the cathode cross section area of at least 0.005 - 0.5. As shown in the figure, the cross sectional area of the cathode stem is smaller than half the cross sectional area of the cathode (3); and wherein the cross sectional area of the submerged cathode compared to the submerged anode area is about the same as shown in the figure; but fails to explicitly teach wherein the cathode is maintained at a temperature at least at the same level as the electrolyte, preferably slightly higher. However, Jarrett does disclose modifying the temperature of the system and keeping the electrolyte at a temperature different from the electrolytic bath temperature in order to protect the electrode from attack by the corrosive electrolyte as well as to enhance the production of aluminum (col. 2, lines 1-55). Therefore, one having ordinary skill in the art at the time of the invention would have found it obvious to modify the temperature of the electrolytic cell in such a way that both the electrodes and the electrolyte are kept at a different temperature, as taught by Jarrett, in order to protect the electrode from attack by the corrosive electrolyte as well as to enhance the production of aluminum.

With regard to claims 52 and 78, even though Jarrett fails to explicitly teach wherein said intermediate electric current lead is manufactured from dense oxidation resistant graphite, a metal and/or a metal alloy such as stainless steel, Incoloy and/or Hastaloy, one having ordinary skill in the art at the time of the invention would have found it obvious to use a metal or a metal alloy such as stainless steel as the electric current lead because stainless steel is well known in the art to be an excellent electrical

conductor as well as to have good corrosion resistance properties. Both the electrolytic bath and coolants used in the method taught by Jarrett are corrosive.

With regard to claim 58, Jarrett discloses wherein the cathode (3) has a cathode stem (bottom portion of the cathode) between the submerged anode (3) and the electrical connection (the figure shows wherein the cathode is electrically connected to the negative terminal of a power supply), said stem having a cross sectional ratio to the cathode cross section area of at least 0.005 - 0.5. As shown in the figure, the cross sectional area of the cathode stem is smaller than half the cross sectional area of the cathode (3).

With regard to claim 60, 62 and 79, Jarrett teaches wherein the temperature of the electrodes are controlled and maintained at a level different from that of the surrounding electrolyte by means of active or passive cooling and/or active and passive heating, such as by having heat pipes, with at least one flow channel connected to the anode stem (col. 2, line 63 to col. 3, line 31, see figure).

With regard to claim 63, Jarrett discloses wherein the cathode of the bipolar electrode is heated by means of inserting a layer of a material with higher electrical resistively/spacer or positioning member (4), than the cathode material between the cathode (3) and the adjacent anode (2; abstract; col. 1, lines 58-65; col. 2, lines 3-11).

4. Claims 43, 56 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jarrett in view of Nguyen, as applied to claim 42 above, in view of Brown (US Patent no. 4,678, 548).

With regard to claims 43, 56 and 61, modified Jarrett discloses all of the method steps, as discussed above, wherein the electrodes are attached to an electrical conductor system through an electrical connection (see figure and claim 3), said connection being cooled using liquid or gas cooling, such as sodium or potassium (col. 2, line 63 to col. 3, line 31); but fails to teach wherein said liquid coolants are water, heavy alcohols, oils, synthetic oils, mercury and/or molten salts.

Brown teaches a method and apparatus for supporting and positioning inert electrodes in electrolytic reduction cells for the production of aluminum (col. 1, lines 9-12) wherein a heat transfer fluid, such as water is passed through a cavity of an inside surface of a positioning means (col. 2, lines 6-17; col. 3, lines 34-36) in order to provide a high heat transfer. Therefore, one having ordinary skill in the art would have found it obvious to use water as a coolant medium, as taught by Brown, in the method of modified Jarrett, in order to provide a high heat transfer.

Response to Arguments

5. Applicant's arguments with respect to claim 39 have been considered but are moot in view of the new ground(s) of rejection. The applicant argues that the prior art made of record fails to teach wherein the temperature of the active surface of the anode

is colder than the temperature of the active surface of the cathode, as amended. Therefore, a new ground of rejection has been presented above.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

7. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZULMARIAM MENDEZ whose telephone number is (571)272-9805. The examiner can normally be reached on Tuesday-Friday from 9am to 7pm.

9. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Harry D Wilkins, III/
Primary Examiner, Art Unit 1723

/Z. M./
Examiner, Art Unit 1723